REMARKS

The present application includes claims 1-32. Claims 1-32 were rejected. Claims 1, 3-4, 13, 16, 21 and 23-24 are amended in response to the Examiner's rejections. Claims 2 and 22 are canceled. In addition, claims 3-4, 16 and 23-24 are amended to correct typographical errors.

Claim 1 is amended to recite the additional limitations of a transducer array mounted to a drive shaft where the drive shaft is coupled to a control member by a drive belt and the control member operates to rotate the drive belt.

Claim 3 is amended to recite the additional limitations of a transducer array connected to a drive shaft and a gear connected to the drive shaft, where a stepper motor operates to rotate the drive shaft by moving a belt that couples the gear to the stepper motor.

Claim 4 is amended to recite the additional limitation of the handcrank employed to pivot the transducer array.

Claim 13 is amended to recite the additional limitations of a gear connected to a drive shaft and a belt forming a loop connecting a motor to the gear, where the drive shaft is rotatable by moving the gear and the motor rotates the drive shaft by moving the belt and gear.

Claim 16 is amended to recite the additional limitations of a transducer unit pivotally mounted on a drive shaft, a gear connected to the drive shaft and a belt coupling

the gear to the stepper motor, where the transducer array is pivoted around the rotation axis by the motor rotating the belt and the belt thereby rotating the gear.

Claim 21 is amended to recite the additional limitations of pivoting a transducer array around a rotation axis by rotating a belt connected to a drive shaft and providing a stepper motor, where the stepper motor rotates the belt.

Claim 23 is amended to recite the additional limitations of mounting a transducer array on a drive shaft and providing a gear and a belt, where the gear is connected to the drive shaft, the drive shaft is rotated by a stepper motor rotating the belt, the belt thereby rotating the gear.

Claim 24 is amended to recite the additional limitation of providing a handcrank employed to pivot the transducer array.

Claims 3-4, 16 and 23-24 are also amended to correct typographical errors.

Claims 1, 3-4, 13, 16, 21 and 23-24 were rejected under 35 U.S.C. § 102(b) as being anticipated by Mochizuki et al., U.S. Patent No. 5,152,294.

Claims 3, 16 and 23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Mochizuki in view of Okunuki et al., U.S. Patent No. 5,460,179.

Claims 4 and 24 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Mochizuki in view of Cerofolini, U.S. Patent No. 5,740,804.

Claims 7-8, 19-20 and 27-28 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Mochizuki in view of Angelsen, U.S. Patent No. 4,757,818.

Claims 10-12, 14 and 30-32 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Mochizuki in view of Cerofolini.

The Applicant first turns to the rejection of claims 1, 3-4, 13, 16, 21 and 23-24 under 35 U.S.C. § 102(b) as being anticipated by Mochizuki. Mochizuki relates to a three-dimensional ultrasonic scanner. Mochizuki describes a swing mechanism that is mechanically fixed to the transducer unit by way of a support shaft and mechanical arms (col. 3, lines 51-66). That is, the transducer unit is mechanically fixed to a pair of arms, and these arms "are securely fixed to the support shaft" which is mechanically fixed to a motor (col. 3, lines 51-70 and col. 4, lines 1-5; FIGS. 2 and 3). The transducer unit is then swung through a fixed arc by a motor and a plurality of gears mechanically fixed to the support shaft (col. 3, lines 67-70 and col. 4, lines 1-12; FIG. 2).

Conversely, Mochizuki does not teach a transducer unit connected or mounted to a drive shaft, where the drive shaft is moved or rotated by a belt connecting or coupling a control member or stepper motor to either the drive shaft or a gear connected to the drive shaft. Instead, Mochizuki describes a transducer array unit that is swung by a mechanical connection to a pair of mechanical arms and a support shaft connected to a motor (col. 3, lines 59-61; col. 4, lines 5-11; FIG. 2). That is, **Mochizuki in no way describes the use or inclusion of any sort, type or kind of belt to move a transducer array.**

Claims 1, 3, 13, 16, 21 and 23 have all been amended to recite a limitation relating to the use of a belt to pivot or rotate a transducer unit.

Mochizuki also does not teach a control member comprising a handcrank employed to pivot a transducer unit. Instead, as described above, Mochizuki describes a transducer unit that acts as a swing mechanism and is powered by a motor, a gear section, a support shaft and suspension arms (col. 4, lines 5-12; FIG. 2). That is, **Mochizuki in no way describes the use or inclusion of any sort, type or kind of handcrank to move a transducer array.**

Claims 4 and 24 have been amended to recite the limitation of a handcrank employed to pivot a transducer array.

The present rejection encompasses independent claims 1, 3-4, 13, 16, 21 and 23-24. Claims 1, 3-4, 13, 16, 21 and 23-24 are amended to recite limitations not taught by Mochizuki. Consequently, the Applicant respectfully submits that independent claims 1, 3-4, 13, 16, 21 and 23-24 should be allowable.

The Applicant now turns to the rejection of claims 3, 16 and 23 under 35 U.S.C. § 103(a) as being unpatentable over Mochizuki in view of Okunuki. Okunuki relates to an ultrasonic transducer assembly and method of scanning. Specifically, Okunuki describes a transducer unit that rotates about a virtual rotative axis (col. 6, lines 13-26; FIG. 3, reference character 32). That is, the **virtual** rotative axis is not manifested in a physical form. Okunuki also describes the movement of a transducer unit by a motor connected to

a belt, where the belt is connected to a pair of guiding arms connected to the transducer unit (col. 6, lines 52-59; col. 7, lines 27-39). The belt moves through a series of rollers and is fixed to a pair of guiding arms (col. 7, lines 27-39). The belt then pulls the guiding arms (and the transducer unit) along a pair of curved guide plates that define the arc by which the transducer unit moves (col. 7, lines 4-12; FIG. 3).

Okunuki does not teach a transducer unit connected or mounted to a drive shaft, where the drive shaft is moved or rotated by a belt connecting or coupling a control member or stepper motor to either the drive shaft or a gear connected to the drive shaft. Conversely, as described above, Okunuki describes the movement of a transducer unit by moving a belt through a series of rollers, where the belt is connected to a pair of guiding arms that pull the transducer unit along an arc defined by a pair of guide plates (col. 7, lines 27-39; FIG. 3). That is, the belt in Okunuki is not connected to any gear or any drive shaft, and the belt in Okunuki does not operate to rotate either a gear or a drive shaft. Instead, the belt in Okunuki pulls a pair of guide arms (and the transducer unit) along an arc defined by a pair of guide plates (col. 7, lines 4-12; FIG. 3).

Thus, the Applicant respectfully submits that Okunuki does not teach or suggest the limitations of the claimed invention.

As described above, Mochizuki relates to a three-dimensional ultrasonic scanner. Okunuki does not remedy the shortcomings of Mochizuki as described above, either alone or in combination, as **neither describe a transducer unit connected or mounted**

to a drive shaft, where the drive shaft is moved or rotated by a belt connecting or coupling a control member or stepper motor to either the drive shaft or a gear connected to the drive shaft. Assuming for the sake of argument that one would combine Mochizuki and Okunuki, the combination would result in a transducer unit mechanically fixed to a pair of mechanical arms that are directly connected to a belt, where the arms are moved along an arc defined by a pair of guide plates.

Thus, the Applicant respectfully submits a combination of Mochizuki and Okunuki does not teach or suggest limitations of the claimed invention.

Claims 3, 16 and 23 have all been amended to recite additional limitations involving a transducer unit connected or mounted to a drive shaft, where the drive shaft is moved or rotated by a belt connecting or coupling a control member or stepper motor to either the drive shaft or a gear connected to the drive shaft.

The present rejection encompasses independent claims 3, 16 and 23. Claims 3, 16 and 23 have been amended to recite limitations not taught by either Okunuki or Mochizuki, alone or in combination. Applicant respectfully submits that claims 3, 16 and 23 recite limitations that are not taught by either Okunuki or Mochizuki, alone or in combination. Consequently, the Applicant respectfully submits that independent claims 3, 16 and 23 should be allowable.

The Applicant now turns to the rejection of claims 4 and 24 under 35 U.S.C. § 103(a) as being unpatentable over Mochizuki in view of Cerofolini. Cerofolini relates to a multipanoramic ultrasonic probe. Cerofolini describes a transducer array rotated about each of two perpendicular axes by a pair of motors and motor shafts (col. 6, lines 22-40; col. 6, lines 64-70 and col. 7, lines 1-16). Each motor rotates the transducer array by a series of gears (col. 6, lines 22-40, 64-68; col. 7, line 1).

Cerofolini does not teach a handcrank employed to pivot a transducer array. More generally, **Cerofolini does not teach the use whatsoever of any sort or type of handcrank employed to pivot a transducer array**. Conversely, Cerofolini describes the use of an electrical signal, two motors and a series of gears to rotate a transducer array (col. 6, lines 22-68; col. 7, lines 1, 17-27) in each of two perpendicular axes (col. 6, lines 22-40; col. 6, lines 64-70 and col. 7, lines 1-16). Thus, the Applicant respectfully submits that Cerofolini does not teach or suggest the limitations of the claimed invention.

As described above, Mochizuki relates to a three-dimensional ultrasonic scanner. Cerofolini does not remedy the shortcomings of Mochizuki as **neither references describe any sort or type of handcrank employed to pivot a transducer array**. Assuming for the sake of argument that one would combine Mochizuki and Cerofolini, the combination would result in a transducer unit mechanically fixed to a pair of mechanical arms fixed to a drive shaft connected to two motors by a series of gears. The combination would allow for rotation of the transducer unit in each of two perpendicular

axes through the use of two motors and the series of gears. Conversely, the present invention describes a handcrank employed to pivot a transducer array.

Thus, the Applicant respectfully submits a combination of Mochizuki and Cerofolini does not teach or suggest limitations of the claimed invention.

The present rejection encompasses independent claims 4 and 24. Claims 4 and 24 have been amended to recite a limitation not taught by either Cerofolini or Mochizuki, alone or in combination. Applicant respectfully submits that claims 4 and 24 recite a limitation not taught by either Cerofolini or Mochizuki, alone or in combination. Consequently, the Applicant respectfully submits that independent claims 4 and 24 should be allowable.

The Applicant now turns to the rejection of claims 7-8, 19-20 and 27-28 under 35 U.S.C. § 103(a) as being unpatentable over Mochizuki in view of Angelsen. Angelsen relates to an ultrasonic transducer probe with linear motion drive mechanism. The transducer unit of Angelsen is connected to a pulley wheel (col. 4, lines 45-48; FIG. 2). The pulley wheel is connected to a flexible pulling mechanism, which is in turn connected to a coil assembly (col. 4, lines 3-5). The coil assembly moves linearly by a cylindrical magnet and magnetic field iron circuit creating a strong magnetic field across an air gap (col. 3, lines 64-68). That is, an electric current is passed through an electric (motor) coil to create an electromagnetic force along a linear direction (col. 3, lines 67-

68; col. 4, lines 1-3). The electric coil and coil assembly then move linearly according to the electromagnetic field (col. 4, lines 6-13). As the flexible pulling element is attached to the coil assembly, the pulling element is also pulled along the linear motion of the assembly (col. 4, lines 40-45). This linear motion of the pulling element is transferred into rotary motion of the transducer unit by two pulley wheels (col. 4, lines 40-48).

Angelsen does not teach a control member comprising a stepper motor where the motor operates to rotate a drive belt. Conversely, Angelsen describes the use of an electromagnetic field and two pulley wheels to rotate a pulling element (col. 4, lines 6-13; col. 4, lines 40-45). That is, **Angelsen does not describe or employ any type or sort of motor to rotate or move a drive belt**.

As described above, Mochizuki describes a transducer unit swing mechanism that is mechanically fixed to the transducer unit by way of a support shaft that is mechanically fixed to a motor (col. 3, lines 51-70; col. 4, lines 1-5; Figures 2 and 3). Angelsen does not remedy the shortcomings of Mochizuki as **neither references describe any sort or type of motor operating to rotate or move a drive belt**. Assuming for the sake of argument that one would combine Angelsen and Mochizuki, the combination would result in a transducer unit mechanically fixed to a pair of mechanical arms fixed to a drive shaft. The drive shaft would then be rotated by use of an electromagnetic field, thus swinging the mechanical arms and the transducer array. Conversely, the present invention describes a motor operating to rotate or move a drive belt.

Claims 1, 13 and 21 are amended to recite the limitation of a motor operating to rotate or move a drive belt. As described above, neither Angelsen nor Mochizuki teach a motor operating to rotate or move a drive belt, alone or in combination. Claims 7-8, 19-20 and 27-28 depend from independent claims 1, 13 and 21. Therefore, Applicant respectfully submits that claims 7-8, 19-20 and 27-28 recite limitations not taught by either Angelsen or Mochizuki, alone or in combination. Consequently, the Applicant respectfully submits that dependent claims 7-8, 19-20 and 27-28 should be allowable.

The Applicant now turns to the rejection of claims 10-12, 14 and 30-32 under 35 U.S.C. § 103(a) as being unpatentable over Mochizuki in view of Cerofolini. As described above, Cerofolini relates to a multipanoramic ultrasonic probe. The transducer unit of Cerofolini is rotated in each of two perpendicular axes through two motors and a series of gears (col. 6, lines 22-40, 64-68; col. 7, line 1).

Cerofolini does not teach a transducer unit mounted on a drive shaft, where a stepper motor is coupled to the drive shaft by a belt and the motor operates to rotate the belt. Cerofolini also does not teach a transducer unit mounted on a drive shaft, where the drive shaft is connected to a gear, and the gear is coupled to a motor by a belt, where the motor rotates the drive shaft by moving the belt and the gear. Conversely, as described above, Cerofolini describes the rotation of a transducer array by two motors and a series

of gears (col. 6, lines 22-40, 64-68; col. 7, line 1). Thus, the Applicant respectfully submits that Cerofolini does not teach or suggest the limitations of the claimed invention.

As described above, Mochizuki relates to a three-dimensional ultrasonic scanner. Cerofolini does not remedy the shortcomings of Mochizuki as described above, either alone or in combination. Assuming for the sake of argument that one would combine Mochizuki and Cerofolini, the combination would result in a transducer unit mechanically fixed to a pair of mechanical arms that are connected to two motors by a series of gears. The transducer unit would then be swung in either of two perpendicular axes by a motor rotating the transducer unit through the series of gears. Conversely, the present invention describes a transducer unit connected or mounted on a drive shaft, where the drive shaft is rotated by moving a belt connected either directly to the drive shaft or to a gear connected to the drive shaft.

Thus, the Applicant respectfully submits a combination of Mochizuki and Cerofolini does not teach or suggest limitations of the claimed invention.

Claim 1 is amended to recite the limitation of a transducer array mounted on a drive shaft, where a motor is coupled to the drive shaft by a drive belt, and the motor operates to rotate the drive belt. Claim 13 is amended to recite the additional limitation of a gear connected to a drive shaft, where a belt connecting the gear to a motor and the motor rotating the drive shaft by moving the belt and gear. Claim 21 is amended to recite

the additional limitation of pivoting a transducer array by rotating a belt connected to a drive shaft.

The present rejection encompasses dependent claims 10-12, 14 and 30-32. Claims 10-12, 14 and 30-32 depend from independent claims 1, 13 and 21. Independent claims 1, 13 and 21 have been amended to recite an additional limitation not taught by either Mochizuki or Cerofolini, alone or in combination. Applicant respectfully submits that claims 1, 13 and 21 recite a limitation not taught by either Mochizuki or Cerofolini, alone or in combination. Consequently, the Applicant respectfully submits that claims 10-12, 14 and 30-32, which depend from claims 1, 13 and 21, should be allowable.

Therefore, the Applicant respectfully submits that the claims of the present application should be allowable over the prior art.

CONCLUSION

If the Examiner has any questions or the Applicant can be of any assistance, the Examiner is invited and encouraged to contact the Applicant at the number below.

The Commissioner is authorized to charge any necessary fees or credit any overpayment to the Deposit Account of GTC, Account No. 070845.

Respectfully submitted,

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